

Alan Poon

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Education

The University of British Columbia, *Doctor of Philosophy in Physics*, 1998
The University of British Columbia, *Bachelor of Science (First Class Honours)*, 1991

Research Experience

Lawrence Berkeley National Laboratory, *Group Leader*, 2009-date; *Staff Scientist (Career)*, 2003-date; *Staff Scientist (Term)*, 2001-2003; *Postdoctoral Fellow*, 1998-2001

Neutrinoless double beta decay research in MAJORANA experiment.

Direct neutrino mass measurement in KATRIN experiment.

Solar neutrino, reactor neutrino and neutrino oscillation research in Sudbury Neutrino Observatory and KamLAND experiments. Notable achievements of these experiments include: discovery of neutrino flavor transformation, resolution of the Solar Neutrino Problem, demonstration of neutrino oscillations and precision measurements of lepton mixing parameters.

University of Washington, Visiting Graduate Research Assistant, 1994-98
Los Alamos National Laboratory, Graduate Research Assistant, 1993-94

Proton source development, thin-film/target (scandium/titanium tritide) development, gamma-ray spectroscopy.

Adjunct & Visiting Positions

Forschungszentrum Karlsruhe, Visiting Scientist, 2008-09
University of Guelph, Associate Graduate Faculty, 2005-09
University of Hong Kong, Honorary Lecturer, 2003-09

Honors & Awards

Forschungszentrum Karlsruhe Fellowship, Forschungszentrum Karlsruhe, 2008-09
SPOT Award, LBNL, 2008
Benjamin Franklin Medal (SNO collaboration), Franklin Institute, 2007
John C. Polanyi Award (SNO collaboration), Govt. of Canada, 2006
Canada Research Chair in Neutrino Physics (declined), Govt. of Canada, 2005
Center of Excellence Foreigner Research Fellowship, Govt. of Japan, 2003
Outstanding Performance Awards, LBNL, 2000 and 2001
University Graduate Fellowship, UBC, 1991-97
6th Prize in Canadian Association of Physicists National Prize Examination, 1991
Arthur Crooker Prize (top experimental graduate), UBC, 1991

Science Scholar (top 20 students in Faculty of Science), UBC, 1991

Merit-based scholarships (Gordon Merritt Shrum Memorial Scholarship, 1991; Thomas and Evelyn Hebb Memorial Scholarship, 1990; Charles and Jane Banks Memorial Scholarship, 1989-91; UBC Scholarship, 1988-91), UBC.

Professional Activities

Sudbury Neutrino Observatory Collaboration

Chair, Scientific Management Board, 2008-09

Chair-Elect, Scientific Management Board, 2007-08

Physics Analysis Coordinator, 2003-08

Member, Scientific Management Board, 2003-date

Member, Long Range Planning Committee, 2003-04

Coordinator, Neutral-Current Detector Physics Working Group, 2002-03; Low Energy Background Group, 2001-03; Data Reduction/Physics Acceptance Group, 2001

Elected Junior Representative, Scientific Management Board, 2000-01

MAJORANA Collaboration

Member, Management Executive Council, 2009-date

Member, Technical Council, 2005-date

KATRIN Collaboration

Member, Collaboration Board, 2009-date

Peer Review

Member, SNOLAB Experimental Advisory Committee, 2009-date

Panelist, US Civilian Research & Development Foundation (CRDF) multi-disciplinary grant review panel on global warming, 2009; Junior Scientist Energy Fellowship program, 2007; Basic Research and Higher Education (BRHE) program, 2005; Cooperative Grants Physics Review Panels, 2004-07

External Reviewer, Harvard University faculty tenure/promotion review, 2007

Reviewer, US Dept. of Energy Office of Science (Nuclear Physics) research support applications, 2006-date

Reviewer, College of Reviewers, Canada Research Chairs Program, 2005-date

External Graduate Degree Examiner, Univ. of Hong Kong, 2005

Conference & Workshop Organization

Scientific Secretary, International Workshop on "Double Beta Decay and Neutrinos" (DBD09), Hawaii, 2009

Member, Organizing Committee for the Neutrinos, Neutrons, and Fundamental Symmetries Town Meeting for the US Long Range Plan in Nuclear Physics, 2006-07

Member, Organizing Committee for the Neutrino Pre-town Meeting for the US Long Range Plan in Nuclear Physics, 2006

Member, Organizing Committee of the Neutrino Physics Planning Satellite Meeting at PANIC 05 conference, 2005

Member, Local Organizing Committee of the US Nuclear Science Long Range Plan Town Meetings, 2000

Co-organizer, American Physical Society Division of Nuclear Physics DNP99 Workshop:
“Quark and Lepton Mixing: CKM Matrix and Beyond”, 1999

Science Outreach

Volunteering Scientist, Community in the Classroom program, Community Resources
for Science (Berkeley, CA), 2002-date

Volunteering Scientist, Education group, Chabot Space & Science Center (Oakland,
CA), 2004

Member, Evaluation Team of the International Physics Olympiad, 1997

Member, Local Organizing Committee of the International Physics Olympiad Western
Canada Training Program, 1995-98

Publications

Refereed Publications

1. K. Boudjemline *et al.*, *The calibration of the Sudbury Neutrino Observatory using uniformly distributed radioactive sources*, submitted to Nucl. Instr. Meth. A for publication, arXiv:0912.2991(2009)
2. B. Aharmim *et al.* (SNO Collaboration), *Low Energy Threshold Analysis of the Phase I and Phase II Data Sets of the Sudbury Neutrino Observatory*, submitted to Phys. Rev. C for publication, arXiv:0910.2984 (2009).
3. B. Aharmim *et al.* (SNO Collaboration), *Searches for High Frequency Variations in the ^8B Solar Neutrino Flux at the Sudbury Neutrino Observatory*, accepted by Ap.J for publication, arXiv:0910.2433 (2009).
4. B. Aharmim *et al.* (SNO Collaboration), *Measurement of the Cosmic Ray and Neutrino-Induced Muon Flux at the Sudbury Neutrino Observatory*, Phys. Rev. D **80**, 012001 (2009), arXiv:0902.2776 (2009).
5. B. Aharmim *et al.* (SNO Collaboration), *An Independent Measurement of the Total Active ^8B Solar Neutrino Flux Using an Array of ^3He Proportional Counters at the Sudbury Neutrino Observatory*, Phys. Rev. Lett., **101**, 111301 (2008).
6. D.B. Campbell *et al.*, *Evaluation of Radioactive Background Rejection in ^{76}Ge Neutrinoless Double-Beta Decay Experiments Using a Highly Segmented HPGe Detector*, Nucl. Instr. Meth. **A587**, 60–67 (2008).
7. J.F. Amsbaugh *et al.*, *An Array of Low-Background ^3He Proportional Counters for the Sudbury Neutrino Observatory*, Nucl. Instr. Meth. **A579**, 1054 (2007).
8. B. Aharmim *et al.* (SNO Collaboration), *Measurement of the ν_e and Total ^8B Solar Neutrino Fluxes with the Sudbury Neutrino Observatory Phase I Data Set*, Phys. Rev. **C75**, 045502 (2007)
9. B. Aharmim *et al.* (SNO Collaboration), *A Search for Neutrinos from the Solar ^8B Reaction and the Diffuse Supernova Neutrino Background with the Sudbury Neutrino Observatory*, Ap.J **653**, 1545 (2006).
10. T. Araki *et al.* (KamLAND Collaboration), *Search for the Invisible Decay of Neutrons with KamLAND*, Phys. Rev. Lett., **96**, 101802 (2006).
11. T. Araki *et al.* (KamLAND Collaboration), *Experimental Investigation of Geologically Produced Antineutrinos with KamLAND*, Nature, **436**, 499 (2005).
12. B. Aharmim *et al.* (SNO Collaboration), *A Search for Periodicities in the ^8B Solar Neutrino Flux Measured by the Sudbury Neutrino Observatory*, Phys. Rev. **D72**, 052010 (2005).

13. B. Aharmim *et al.* (SNO Collaboration), *Electron Energy Spectra, Fluxes, and Day-Night Asymmetries of ^8B Solar Neutrinos from Measurements with NaCl Dissolved in the Heavy-Water Detector at the Sudbury Neutrino Observatory*, Phys. Rev. **C72**, 055502 (2005).
14. T. Araki *et al.* (KamLAND Collaboration), *Measurement of Neutrino Oscillation with KamLAND: Evidence of Spectral Distortion*, Phys. Rev. Lett., **94**, 081801 (2005).
15. B. Aharmim *et al.* (SNO Collaboration), *Electron Antineutrino Search at the Sudbury Neutrino Observatory*, Phys. Rev. **D70**, 093014 (2004).
16. S.N. Ahmed *et al.* (SNO Collaboration), *Measurement of the Total Active ^8B Solar Neutrino Flux at the Sudbury Neutrino Observatory with Enhanced Neutral Current Sensitivity*, Phys. Rev. Lett., **92**, 181301 (2004).
17. S.N. Ahmed *et al.* (SNO Collaboration), *Constraints on Nucleon Decay via ‘Invisible’ Modes from the Sudbury Neutrino Observatory*, Phys. Rev. Lett., **92**, 102004 (2004).
18. K. Eguchi *et al.* (KamLAND Collaboration), *A High Sensitivity Search for $\bar{\nu}_e$ ’s from the Sun and Other Sources at KamLAND*, Phys. Rev. Lett., **92**, 071301 (2003).
19. K. Eguchi *et al.* (KamLAND Collaboration), *First Results from KamLAND: Evidence for Reactor Anti-Neutrino Disappearance*, Phys. Rev. Lett., **90**, 021802 (2003).
20. Q.R. Ahmad *et al.* (SNO Collaboration), *Measurement of Day and Night Neutrino Energy Spectra at SNO and Constraints on Neutrino Mixing Parameters*, Phys. Rev. Lett., **89**, 011302 (2002).
21. Q.R. Ahmad *et al.* (SNO Collaboration), *Direct Evidence for Neutrino Flavor Transformation from Neutral-Current Interactions in the Sudbury Neutrino Observatory*, Phys. Rev. Lett., **89**, 011301 (2002).
22. Q.R. Ahmad *et al.* (SNO Collaboration), *Measurement of the charged current interactions produced by ^8B solar neutrinos at the Sudbury Neutrino Observatory*, Phys. Rev. Lett., **87**, 071301 (2001).
23. A.W.P. Poon, R.J. Komar, C.E. Waltham, M.C. Browne, R.G.H. Robertson, N.P. Kherani, and H.B. Mak, *A Compact $^3\text{H}(p,\gamma)^4\text{He}$ 19.8-MeV Gamma-Ray Source for Energy Calibration at the Sudbury Neutrino Observatory*, Nucl. Instr. Meth. **A452**, 115 (2000).
24. J. Boger *et al.* (SNO Collaboration), *The Sudbury Neutrino Observatory*, Nucl. Instr. Meth. **A449**, 172 (2000).
25. M.C. Browne *et al.*, *Low-background ^3He Proportional Counters for Use in the Sudbury Neutrino Observatory*, IEEE Trans. Nucl. Sci., **46**, 873 (1999).

26. Alan W. Poon and Christopher E. Waltham, *Neutrino Electromagnetic Scattering in Astrophysical Systems*, Can. J. Phys., **70**, 140 (1992).
27. G. Ouellette, C.E. Waltham, R. Meijer Drees, A. Poon, R. Schubank, and L.A. Whitehead, *Nonimaging Light Concentration Using Total Internal Reflection Films*, Applied Optics, **31**, 2360 (1992).

Conference Proceedings

1. C.E. Aalseth et al. (MAJORANA Collaboration), *The MAJORANA DEMONSTRATOR: An R&D Project towards a Tonne-Scale Germanium Neutrinoless Double-Beta Decay Search*. Proceedings of CIPANP 2009: 10th Conference on the Intersections of Particle and Nuclear Physics, San Diego, California, 26-31 May 2009. Published in AIP Conf.Proc.1182:88-91,2009, arXiv:0907.1581.
2. V.E. Guiseppe et al. (MAJORANA Collaboration), *The MAJORANA Neutrinoless Double-Beta Decay Experiment*, Proceedings of IEEE Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC) and 16th International Workshop on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors (arXiv:0811.2446).
3. A.W.P. Poon, *Review of Solar and Reactor Neutrinos*, Proceedings of the XXII International Symposium on Lepton and Photon Interactions at High Energy (Lepton-Photon 2005), World Scientific, 2006 (arXiv:hep-ex/0509024).
4. N. Tolich et al., *A Geoneutrino Experiment at Homestake*, Proceedings of Neutrino Sciences 2005: Neutrino Geophysics (arXiv:physics/0607230).
5. M. Bauer et al., *MaGe: A Monte Carlo framework for the Gerda and MAJORANA double beta decay experiments*, Proceedings of 9th International Conference on Astroparticle and Underground Physics (TAUP 2005), J.Phys.Conf.Ser.39:362,2006.
6. A.W.P. Poon for the SNO Collaboration, *Solving the Solar Neutrino Problem 2 km Underground—the Sudbury Neutrino Observatory in Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications*, ed. M. Barone, E. Borchini, C. Leroy, P.-G. Rancoita, P.-L. Riboni, and R. Ruchti, pg. 121, World Scientific (2004).
7. A.W.P. Poon for the SNO Collaboration, *Recent Results from the Sudbury Neutrino Observatory*, Proceedings to the International Europhysics Conference on High Energy Physics (EPS2003), Eur. Phys. J. **C33**, s01, s823-s825 (2004), arXiv:nucl-ex/0312002.
8. A.W.P. Poon for the SNO Collaboration, *Solar Neutrino Observations at SNO*, Proceedings to the Topical Conference of the SLAC Summer Institute 2002, eConf C020805:TTH01, 2002 (hep-ex/0211013).
9. A.W.P. Poon for the SNO Collaboration, *Neutrino Observations from the Sudbury Neutrino Observatory*, Proceedings to the International Nuclear Physics Conference (INPC2001), ed. E. Norman, L. Schroeder and G. Wozniak, pg 218, American Institute of Physics (2002).

10. A.W.P. Poon, M.C. Browne, N.P. Kherani, R.G.H. Robertson and C.E. Waltham, *A Compact ${}^3\text{H}(\text{p},\gamma){}^4\text{He}$ 20 MeV Gamma-Ray Source for Energy Calibration at the Sudbury Neutrino Observatory* in *Particles and Cosmology*, ed. E.N. Alexeev, V.A. Matveev, Kh. S. Nirov, V.A. Rubakov, p. 248, World Scientific (1996).

Plus over 50 additional conference proceedings as member of MAJORANA, KamLAND and SNO collaborations.

Other Publications

1. Nick Jelley and Alan Poon, *SNO: Solving the Mystery of the Missing Neutrinos*, CERN Courier, Vol. 47, No.4, Article 19 (2007).
2. M.J. Ramsey-Musolf *et al.*, *Nuclear Science and the New Standard Model: Fundamental Symmetries and Neutrinos in The Next Decade*, White Paper of the US Nuclear Science Advisory Committee Long Range Plan town meeting on neutrinos, neutrons and fundamental symmetries (May 2007).
3. Richard Gaitskell *et al.*, (the Majorana Collaboration), *Proposal for the Majorana Zero-Neutrino Double-Beta Experiment*, arXiv:nucl-ex/0311013 (2003).
4. The Homestake Collaboration, *The National Underground Science and Engineering Laboratory at Homestake: Project Book, Reference Design Stage*, arXiv:nucl-ex/0308018 (2003).

Presentations

Invited Talks at Conferences

1. *Backgrounds in Underground Experiments*, invited talk at the Overseas Chinese Physics Association Underground Science Conference, Hong Kong (July 21-23, 2008).
2. *Review of Solar Neutrinos*, invited talk at the Overseas Chinese Physics Association Underground Science Conference, Hong Kong (July 21-23, 2008).
3. *MAJORANA Progress*, invited guest talk at the GERDA collaboration meeting, LNGS, Italy (June 9-11, 2008).
4. *Solar Neutrino Results from Phase III of the Sudbury Neutrino Observatory*, invited guest talk at the GERDA collaboration meeting, LNGS, Italy (June 9-11, 2008).
5. *SNO*, invited guest talk at the KATRIN collaboration meeting, Karlsruhe, Germany (October 8-10, 2007).
6. *Review of Solar and Reactor Neutrino Experiments*, plenary review talk at the XXII International Symposium on Lepton-Photon Interactions at High Energy (Lepton-Photon 2005), Uppsala, Sweden (June 30-July 5, 2005).
7. *Solving the Solar Neutrino Problem 2 km Underground—the Sudbury Neutrino Observatory*, plenary talk at the 8th International Conference on Advanced Technology and Particle Physics, Villa Erba, Como, Italy (Oct. 6-10, 2003).
8. *Recent Results from the Sudbury Neutrino Observatory*, invited talk at the International Europhysics Conference on High Energy Physics, Aachen, Germany (July 17-23, 2003).
9. *The Nu Odyssey 2002 — SNO & KamLAND*, opening plenary talk at the Institute of Physics Particle Physics 2003 Conference, Durham, UK (April 14-16, 2003).
10. *Solar Neutrino Observations at the Sudbury Neutrino Observatory*, invited talk at the Topical Conference of the 2002 SLAC Summer Institute, Stanford Linear Accelerator Center, Stanford University, Menlo Park, CA, USA (Aug. 15, 2002).
11. *Neutrino Observations from the Sudbury Neutrino Observatory*, plenary talk at the International Nuclear Physics Conference, Berkeley, CA, USA (Jul. 30-Aug. 3, 2001).
12. *Cavity Backgrounds at SNO and Kamioka*, invited talk at the Neutrino Workshop at the Institute of Nuclear Theory, University of Washington, Seattle, WA, USA (Sep. 2000).

Colloquia

1. *Solar Neutrinos: From their Discovery to the Precision Measurements of Lepton Mixing*, physics colloquium at Universität Karlsruhe, Karlsruhe, Germany (May 29, 2009).
2. *Disappearance of Reactor Anti-Neutrinos at KamLAND*, physics colloquium at Queen's University, Kingston, ON, Canada (August 18, 2004).
3. *Understanding Neutrino Mass and Mixing*, physics colloquium at Queen's University, Kingston, ON, Canada (May 3, 2004).
4. *Understanding Neutrino Mass and Mixing*, physics colloquium at the University of Guelph, Guelph, ON, Canada (April 29, 2004).
5. *Resolution of the Solar Neutrino Problem—Recent Results from KamLAND and the Sudbury Neutrino Observatory*, particle physics colloquium at Osaka University, Osaka, Japan (Dec. 5, 2003).
6. *Evidence for Reactor Anti-Neutrino Disappearance at KamLAND*, Joint Nuclear and Astro-Particle Physics Colloquium of the Universities of Karlsruhe, Tuebingen and Heidelberg and the national research center at Karlsruhe (FZK), Karlsruhe, Germany (July 15, 2003).
7. *The Nu Odyssey 2002*, Physics and Theoretical Divisions Colloquium, Los Alamos National Laboratory, Los Alamos, NM, USA (May 22, 2003).
8. *Case Closed: The Missing Solar Neutrinos are Found, but What's Next?*, Martin Weiner Lecture Series (Physics Colloquium) at Brandeis University, Waltham, MA, USA (Nov. 12, 2002).
9. *Latest Results from the Sudbury Neutrino Observatory*, colloquium at the Aspen Center for Physics, Aspen, CO, USA (June 20, 2002).
10. *Solving the Solar Neutrino Problem with 1 kt of Heavy Water 2 km Underground*, colloquium at the Department of Nuclear Engineering, University of California, Berkeley, CA, USA (May 6, 2002).

Seminars (since 2000)

1. *Solar Neutrinos: From their Discovery to the Precision Measurements of Lepton Mixing*, seminar at Paul Scherrer Institut, Villigen, Switzerland (June 15, 2009).
2. *Lectures on Statistics and Analysis Techniques in Nuclear and Particle Physics*, a five-lecture series on statistics and analysis techniques at Institut für Kernphysik, Universität Münster, Münster, Germany (May 19-22, 2009).
3. *Probing the Neutrino Mass (with β and $\beta\beta$ decays)*, seminar at TRIUMF, Vancouver, Canada (February 19, 2009).

4. *Lectures on Statistics and Analysis Techniques in Nuclear and Particle Physics*, a ten-lecture series on statistics and analysis techniques at Forschungszentrum Karlsruhe/Karlsruhe Institute of Technology (November 2008-April 2009).
5. *Non-Accelerator Neutrino Physics*, joint University of Hong Kong and Chinese University of Hong Kong four-lecture series (July 10-11, 2008).
6. *hep and Diffused Supernova Neutrino Background Search at SNO*, seminar at the Lawrence Berkeley National Laboratory, Institute for Nuclear and Particle Astrophysics Journal Club, Berkeley, CA, USA (Jul. 13, 2006).
7. *Neutrinos*, presentation to high school teacher participants in QuarkNet, LBNL, Berkeley, CA, USA (June 26, 2006).
8. *Get Kids Excited About Science!*, LBNL Institute for Nuclear and Particle Astrophysics Journal Club, Berkeley, CA, USA (September 16, 2005) [Co-presenter: Corinn Brown, Community Resources for Science, Berkeley].
9. *Probing Physics Beyond the Standard Electroweak Model with Solar Neutrinos*, Physics seminar, University of California, Berkeley, CA, USA (Sept. 7, 2005).
10. *Understanding Neutrino Mass and Mixing*, seminar at the University of Hong Kong, Hong Kong, China (Nov. 1, 2004).
11. *Understanding Neutrino Mass and Mixing with the Sudbury Neutrino Observatory and the Majorana Double-Beta Decay Experiment*, seminar at the University of Massachusetts, Amherst, MA, USA (Feb. 6, 2004).
12. *Resolution of the Solar Neutrino Problem—Recent Results from the Sudbury Neutrino Observatory and KamLAND*, seminar at Academia Sinica, Taipei, Taiwan (Dec. 10, 2003).
13. *Measurement of the Total Active ^8B Solar Neutrino Flux at the Sudbury Neutrino Observatory with Enhanced Neutral Current Sensitivity*, lecture at the high energy physics seminar course (Physics 290E) at University of California, Berkeley, CA, USA (Oct. 15, 2003).
14. *The Nu Odyssey 2002 — Results from SNO and KamLAND*, seminar at the University of Oxford, Oxford, UK (April 17, 2003).
15. *Direct Evidence for Neutrino Flavor Transformation from Neutral-Current Interactions in the Sudbury Neutrino Observatory*, seminar at Brown University, Providence, RI, USA (Nov. 13, 2002).
16. *Direct Evidence for Neutrino Flavor Transformation from Neutral-Current Interactions in the Sudbury Neutrino Observatory (SNO)*, experimental seminar at the Stanford Linear Accelerator Center, Stanford University, Menlo Park, CA, USA (May 16, 2002).

17. *Solving the Solar Neutrino Problem 2 km Underground — the Sudbury Neutrino Observatory*, seminar at the University of Hong Kong, Hong Kong, China (Mar. 25, 2002).
18. *Neutrino Observations from the Sudbury Neutrino Observatory (I)*, seminar at the Lawrence Berkeley National Laboratory, Institute for Nuclear and Particle Astrophysics Journal Club, Berkeley, CA, USA (Jul. 13, 2001).
19. *Calibrating the Sudbury Neutrino Observatory (SNO)*, seminar at the Nonproliferation and International Security Division, Los Alamos National Laboratory, Los Alamos, NM, USA (May 31, 2001).
20. *Solar Neutrino Observations from the Sudbury Neutrino Observatory*, seminar at the Department of Physics, Brown University, Providence, RI, USA (Mar. 7, 2001).
21. *The Sudbury Neutrino Observatory — 6 Months into Production Running*, invited talk at the Joint Experimental-Theoretical Seminar at Fermilab, Batavia, IL, USA (Jul. 7, 2000).
22. *Review of Neutrino 2000 at Sudbury*, seminar at the Lawrence Berkeley National Laboratory Physics Division Research Progress Meeting, Berkeley, CA, USA (Jun. 29, 2000).
23. *Mining for Solar Neutrinos 2 km Underground: The Sudbury Neutrino Observatory*, seminar at Princeton University, Princeton, NJ, USA (Jan. 14, 2000).